

QUARTERLY SUMMARY
OF THE
IMPROVEMENTS AND DISCOVERIES
IN THE
MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Researches on the Cause of the Fluidity of the Blood.*—Dr. B. W. RICHARDSON, in a paper read before the Chemical Section of the British Association for the Advancement of Science, commenced by giving a historical sketch of the various hypotheses which had been formed to account for the fluidity of the blood and the phenomena of coagulation. He then related his own investigations, which had led him to the discovery that ammonia is a constituent of the blood, and that on its presence the solubility of fibrin, and therefore the fluidity of the blood, is dependent. The numerous experiments performed by the author were described: they may be thus briefly classified: 1. By causing the vapour arising from coagulating blood to pass through another quantity of blood, drawn as nearly as possible at the same time and from the same animal, the coagulation of the latter is suspended so long as the current of vapour is kept up. 2. By driving the vapour of coagulating blood into pure hydrochloric acid, and afterwards treating with chloride of platinum, the characteristic yellow crystals of ammonio-chloride of platinum are procurable. 3. On collecting a large quantity of freshly drawn blood in a wide-mouthed jar, and placing over it a cover, to the interior of which is fixed a slip of glass moistened with hydrochloric acid, the glass becomes covered with microscopic crystals of chloride of ammonium. 4. If fibrin removed from blood be carefully dissolved in a weak solution of ammonia, and again added to the serum and red particles, coagulation may be induced. The result arrived at was, that the phenomenon of coagulation depends essentially on the evolution of ammonia from the blood: and this gives an explanation of the modifications observed in the process of coagulation under various physical conditions. In concluding his paper, Dr. Richardson pointed out that ammonia, in combination with carbonic acid gas, is a constant constituent of the air expired in the breath. The presence of ammonia in the animal economy, and its evolution in respiration, was of interest in that it connected more closely the link that exists between the animal and vegetable worlds. But the subject was of the greatest importance in relation to the causes, the nature, and the treatment of various diseases.—*Proceedings of British Assoc. for Advancement of Science*, 1856.

2. *Contractility of Tendons.*—M. JULES GUERRIN read, on the 3d of March last, an interesting memoir on this subject before the Academy of Sciences, which is published in the *Gazette Médicale de Paris*, March 8, 1856. In this memoir, the author questions the accuracy of the doctrine taught by Bichat and subsequent anatomists, that the tendons are merely passive instruments for the transmission of motion—that they are inert cords, and have no contractility. For ten years he has entertained the conviction that tendons possessed contrac-

tility, although of a different character from that inherent in muscular structure. He thus sums up the results of his observations :—

1. *Histological Facts.*—M. Guérin long since demonstrated that, under certain determinate conditions, such as constant and excessive tension, a muscle may pass into the fibrous state, resembling, in every histological particular, its tendon, of which it now forms but a mere prolongation. Able microscopists have repeatedly found themselves quite unable to distinguish between the two. From this identity of structure he was led to infer identity of function. Moreover, he, as well as other surgeons, had observed that muscles, evidently in a fibrous state prior to an operation, the result of which was the restoration of their normal length and tension, frequently, in the course of years, or even of months, regain their fleshy condition.

2. *Pathological facts* enable us to establish directly the conclusions proceeding from the above induction. In 1840, M. Guérin first proved that tendons are susceptible of a special retraction, independently of the muscle properly so called—that is to say, that they may become and remain shortened, as a consequence of a kind of spasm limited to their sphere of action. This, besides being met with in various lesions implicating only the tendons (as in certain burns, abscesses, etc.), is of frequent occurrence, and easy to recognize in rheumatic and scrofulous affections of the joints. The anatomical character of tendinous retraction, distinguishing it from the retraction of the muscle properly so called, is the diminution of the length of the tendon in relation to the muscle, which preserves its normal length. The contrary takes place when the muscular fibre primarily participates in the retraction, or is its principal seat. The retraction originates in a lesion and pain localized near the insertion of the tendon, as in certain arthralgias, under the influence of which an attitude of the joint is assumed in relation to the action of the shortened tendons, without participation of the muscles properly so called. Such attitude has been supposed to be assumed voluntarily, in order to obtain relief from pain; but an inspection of the special directions imparted to the parts, shows that these much oftener relate to the isolated action of this or that tendon, than to the collective action of the muscles that move the joint. This retraction, as in the case of that of muscles, is but the pathological expression of a physiological property possessed by the tendons.

3. *Physiological Facts.*—The tendon of the patella is separable into two distinct portions, just as if they were separate tendons, which may be termed *infra-patellar* and *supra-patellar* tendons. It happens not unfrequently, as a consequence of disease, that the patella becomes ankylosed, or fixed to the femur, isolating from the muscular extremity of the tendon, the contraction proper to the latter. On observing what takes place in such persons, during efforts to raise the limb, we find that, at the same time, the extensor muscles of the thigh contract, the *infra-patellar* tendon—*i. e.*, the portion situated between the immovable patella and the tibia participates in this contraction, becoming sensibly hardened and shortened both to the touch and sight. We may, indeed, observe within ourselves the contractions of this *infra-patellar* tendon during certain attitudes. If, while in the sitting posture, we place our fingers along its track, we find it become distended and hardened during every effort made to raise the leg, still keeping it at the same degree of flexion, the patella remaining immovable and strongly applied against the femur.

4. *Nature of the Contractility.*—The contractility of tendons is not identical with that of muscles, for it cannot be induced by galvanism. There are, too, other contractile organs, not excitable by galvanism, such as the *dartos*. The muscles themselves present sometimes an exceptional state; for, after saturnine paralysis, they continue to contract under the influence of the will, but are completely insensible to the influence of galvanism. By means of two experiments, M. Guérin endeavours to point out the limits of both muscular and tendinous contraction; and he considers that the latter comes into operation when the weight of the body to be moved induces resistance. Hence he terms this tendinous contractility the *contraction de résistance*, indicating thus its true experimental character, and its difference from voluntary contraction.

In another memoir soon to appear, M. G. promises to point out the physiolo-

gical consequences, and the pathological applications, which result from the facts announced in the present memoir.

3. *Anatomy of the Kidney.*—BUSCH, in a late paper (*Virchow's Archiv.*, 1855), after alluding to the investigations of Goodsir and Müller regarding the formation of secretion in cells, which burst and allow its outflow, he specially mentions the discovery by Müller, of the formation of secretion vesicles containing clear fluid and uric acid salts in the interior of the cells, which grow and occupy the whole cell eventually, and finally the granules of salts are liberated into the excretory ducts. The snail is particularly referred to. Müller concluded that only the secretion vesicles were excluded, and new ones formed by the cells. The author had observed granules of uric acid salts also between the secretion vesicle and the cell wall, and some cells also with these granules and no secretion vesicles. Hence the latter are not necessary for the filling of the cells with urinary precipitates. In almost all cases, the first amorphous granular urinary material forms before the vesicle, whose walls are formed out of the cell-contents round the partially precipitated urine. The author enters at length into the discussion regarding the chemical character of the urinary deposit, whether it be a simple acid, or a salt, and what salt; and also regarding the proof that the urine is not brought to the kidneys as a salt, and soluble, but that the cells of the gland produce it by a chemical process out of the material brought to them. He goes on to speak of the different views of the relation between the Malpighian bodies and the urinary tubes, and determines, by his observations on snakes, that they are decidedly inclosed in a capsule, being the enlarged termination of the urinary canals. The snake has the Malpighian body quite at the termination, whilst the triton only has it in a wider part of the canal; and in the snake ciliated epithelium exists at the margin, uniting the body to the tube just as Bowman described in the frog. The chief part of the wall of the capsule is lined by a polygonal epithelium, and on the free surface of the knot of vessels inside the capsule a distinct epithelium may be seen in fortunate cases, which in the embryo of the cellular matrix may occasionally be witnessed crossing bridge-like from one convolution of the vessels to another; but no connective tissue was visible between the cells and the vessels. The vessels seem to pierce the capsule, carrying a layer of epithelium before them. In general, the Malpighian vessels in the lower animals are merely windings of the same vessel, but in some, as in the viper, divisions and ramifications of the vessel existed. At least in the kidneys of snakes the ciliated epithelium is seen entering low down the tubes, provided that water is not used in the preparation. Each cell is seen, when the movement becomes slow, to have only one cilium, which moves about like a whiplash. Ciliary movement could not be seen in the kidneys of birds.—*B. and F. Med. Chirurg. Rev.*, Oct., 1856, from *Virchow's Archiv.*, No. 5, 1855.

4. *Development of Joints.*—LUSCHKA from observation having determined that the pubic articulation was the lowest step in the formation of an articulation, conjectures that it might possibly represent a certain stage of development in other joints. Having found in the human and other foetus, that a fibrous substance enveloped the articulating cartilage, and moreover that, in the cartilage of the pubic joints, such a material was spread over its hyaline foundation (*grund-masse*), and afterwards that variously formed small microscopical projections were formed which, along with their substratum, passed into a fluid synovium; and that, finally, a cavity bounded by smooth cartilage was produced, he thought that this might be the ordinary process in the formation of all joints. He took for examination the union between the second and the seventh and intervening ribs with the sternum, and also that between the manubrium and the body of the sternum. In the above-mentioned cases, the union in early life is often by a species of continuity, and effected by means of a fibrous substance instead of by a proper articulation, which becomes lost in the cartilage-mass covering the costal sinus in the edge of the sternum. When a very small cavity exists, the cartilage of the rib and the sternum is covered with an extensive fibrillation, and exhibits on the surface turned towards the cavity, a very un-